

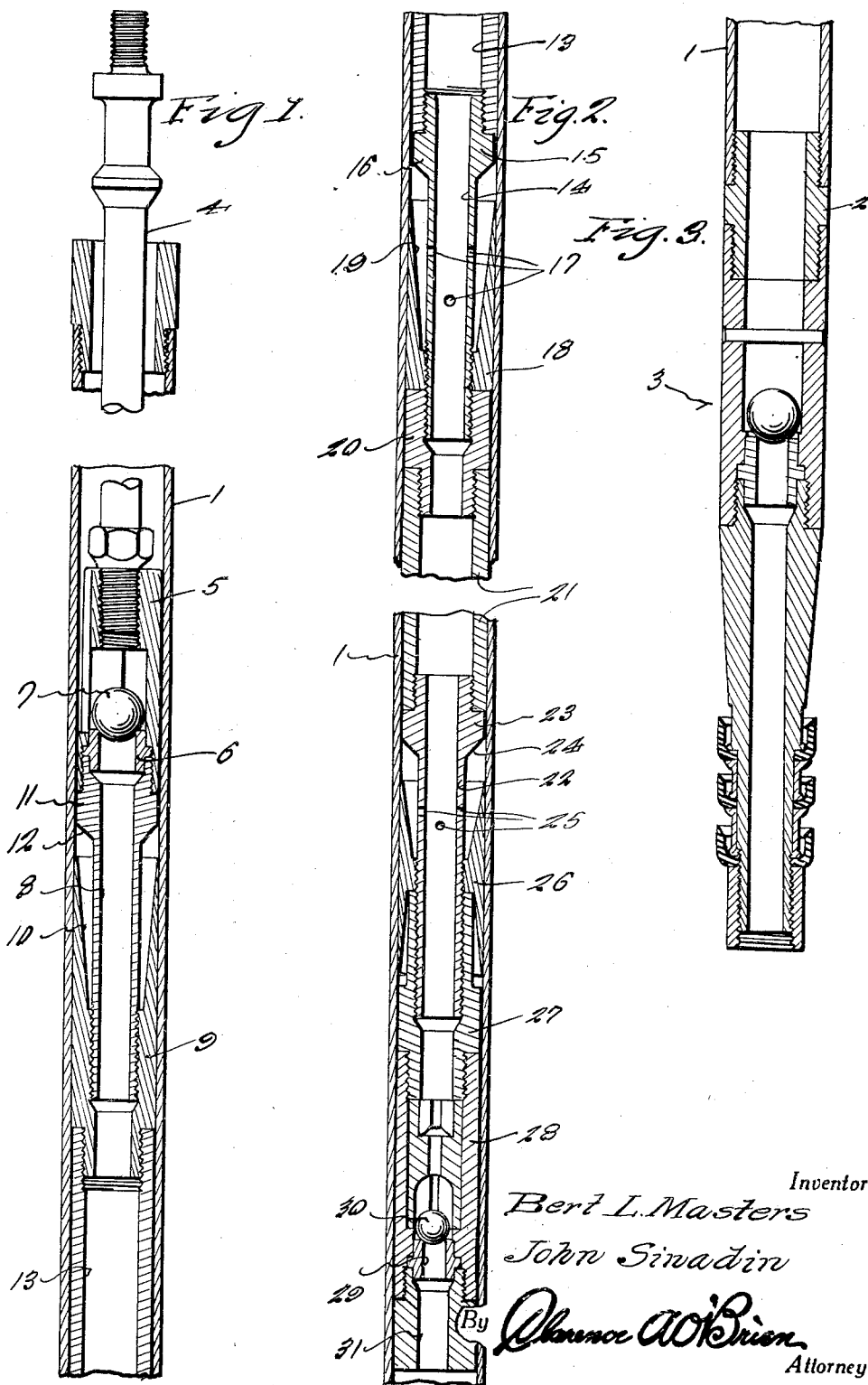
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B. L. MASTERS ET AL

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PUMP

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BERT L. MASTERS AND JOHN SINADIN, OF MIDWEST, WYOMING

PUMP

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This invention relates to new and useful improvements in pumps which are particularly adapted for operation in oil wells but it is understood, of course, that a pump in accordance with this invention may be used in any type of well for which same may be found adapted and desirable.

An important object of the invention is to provide, in a manner as hereinafter set forth, a pump of the aforementioned character having a reciprocating plunger unit which embodies a plurality of expansible metallic sleeves, certain of the sleeves being expanded by fluid pressure against the interior of the pump barrel in a manner to provide a leak-proof joint, thus eliminating the usual leather or composite cups.

Another important feature of the invention resides in the provision of a plunger unit embodying a novel construction and arrangement of parts whereby the fluid which is being elevated, besides being utilized to expand the metallic sleeves, against the pump barrel is deposited on the walls of the pump barrel for lubricating same and thereby materially reducing friction and wear on the barrel and the plunger.

Another important object of the invention is to provide a pump of the character described which may be expeditiously assembled or disassembled with a minimum expenditure of time and labor for the purpose of replacing any worn or broken parts, or for other reasons.

Other objects of the invention are to provide a pump of the character set forth which will be simple in construction, strong, durable, efficient in operation and which may be manufactured at low cost.

All of the foregoing and still further objects and advantages of the invention may become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:

Figure 1 is a view in longitudinal section showing the upper portion of a pump barrel and a plunger constructed in accordance with

this invention mounted in position in the barrel,

Figure 2 is a view in longitudinal section of an intermediate portion of the barrel showing the lower portion of the plunger therein,

Figure 3 is a view in longitudinal section through the standing valve unit which is mounted on the lower end of the barrel, said lower end portion being shown threaded on the upper end of the standing valve unit.

Referring to the drawings in detail it will be seen that the reference numeral 1 designates the pump barrel having detachably connected to its lower end by the coupling 2 (see Figure 3) a conventional standing valve unit which is designated generally by the reference numeral 3.

A pump rod 4 extends into the upper end portion of the barrel 1 for vertical reciprocation therein and has threaded on its lower end portion a valve cage 5 in the lower end portion of which is mounted the valve seat 6.

A ball check valve 7 is disposed in the cage 5 and engageable on the seat 6 in an obvious manner.

A sleeve rod 8 of tubular form is threaded into the lower end portion of the cage 5 and depends from said cage and terminates in a threaded lower end portion upon which is threaded an upper bronze sleeve 9 having a tapered upper portion 10. The upper portion of the sleeve rod 8 is enlarged as at 11 to provide a tapered shoulder 12.

A connecting pipe section 13 is threaded on the lower end of the upper bronze sleeve 9 and depends therefrom in the barrel 1. The sleeve 9 snugly engages the walls of the barrel 1 but the connecting pipe section 17 is of a diameter to provide some clearance between itself and the barrel.

Referring now to Figure 2 of the drawings, it will be seen that an intermediate tubular sleeve rod 14 is threaded into the lower end portion of the connecting pipe section 13 and is flanged, as at 15, at its upper portion to provide the tapered shoulder 16. The tubular sleeve rod 14 is also threaded on its lower end portion and is provided, in its intermedi-

ate portion, with the perforations or openings 17.

An expansible intermediate bronze sleeve 18 is threaded upwardly on the tubular sleeve rod 14 to a point in spaced relation to the lower end of said rod 14 and the interior of the sleeve 18 tapers upwardly as indicated at 19. The sleeve 18 snugly engages the barrel 1.

10 A coupling 20 is threaded on the lower end portion of the tubular sleeve rod 14 and a connecting pipe section 21 is threaded on the coupling 20. A lower tubular sleeve rod 22 is threaded into the lower end portion of the connecting pipe section 21 and has 15 formed on its upper portion a flange 23 for providing the tapered shoulder 24.

The lower portion of the tubular sleeve rod 22 is externally threaded and an intermediate 20 portion of the tubular sleeve rod 22 has formed therein the perforations or openings 25. The perforations or openings 25 are spaced above the threaded portion of the tubular sleeve rod 22.

25 A lower bronze sleeve 26 is threaded upwardly on the tubular sleeve rod 22 to a point in spaced relation to the lower end of said rod 22. It will be noted that the intermediate portion of the interior of the sleeve 26 is 30 threadedly engaged with the tubular sleeve rod 22 and the end portions of the sleeve 26 are oppositely tapered in a manner to provide upper and lower oil scraping edges.

A coupling 27 is threaded on the lower end 35 portion of the lower tubular sleeve rod 22 and the upper end of the coupling 27 is in abutting engagement with the shouldered interior of the lower expansible sleeve 26.

40 A valve cage 28 of conventional construction is threaded on the lower end of the coupling 27 and has mounted in its lower end portion the seat 29 upon which is engageable the lower ball check valve 30 which is operable in the cage 28.

45 An extension 31 is threaded into the lower end portion of the cage 28. In operation, on the upstroke of the plunger, the fluid is drawn into the barrel 1 through the standing valve unit 3 in the usual manner. On the down- 50 stroke of the plunger the fluid is trapped in the barrel 1 by the standing valve 3 and is forced upwardly through the plunger past the ball check valves 7 and 30 into the well tubing (not shown).

55 It will be apparent that in a well of the usual depth the fluid in the barrel 1 and in the plunger unit will be under considerable pressure and the said fluid will pass through the perforations or openings 17 and 25 in the tubular sleeve rods 14 and 22 respectively and 60 expand the upper portions of the bronze sleeves 18 and 26 against the barrel 1 in a manner to provide a leakproof joint.

65 It will be further apparent that the upper ends of the bronze sleeves 18 and 26 will func-

tion as scraping edges for removing excess oil and corrosion from the interior of the barrel 1, and thus reducing wear on the barrel and materially prolonging the life thereof.

It will also be obvious that the fluid which passes through the perforations or openings 17 and 25 will lubricate the interior of the barrel 1 at all times when the pump is in operation. The upper ends of the sleeves 9, 18 and 26 scrape the interior of the barrel 1 70 to remove excess oil or fluid and foreign matter from said barrel on the upstroke of the plunger unit and the lower end of the bronze sleeve 26 removes the excess oil and form matter from the interior of the barrel 1 on the downstroke of the plunger unit. 75

Each of the bronze sleeves 9, 18 and 26 is of slightly greater diameter than the rest of the elements comprising the plunger and consequently the sleeves will receive practically 80 all of the wear which takes place on the plunger unit due to the reciprocation of same in the barrel 1. The sleeves 9, 18 and 26 are of suitable material, such as bronze which will cause a minimum of wear to take place on the interior of the barrel 1. 85

Any desired number of the sleeves may be incorporated in a pump plunger unit. It is believed that the many advantages of a pump constructed in accordance with this invention will be readily understood, and although the preferred embodiment of the invention is as illustrated and described, it is to be understood that changes in the details of construction may be had which will fall 90 within the scope of the invention as claimed.

What is claimed is:

A pump comprising a barrel, and a plunger slidable in the barrel, said plunger including a series of tubular rods having fluid outlet openings in intermediate portions thereof, said rods each including an enlarged end portion having sliding contact with the casing, the end portions of the tubular rods being threaded, expansible metallic sleeves mounted on the tubular rods in spaced relation to the enlarged end portions thereof and defining, in conjunction with said enlarged end portions, fluid receiving chambers in the barrel, the openings in the tubular rods communicating with the chambers for the passage of fluid thereinto for expanding the sleeves against the barrel, said sleeves each comprising internally tapered end portions extending over the openings in spaced relation thereto, and means threadedly connecting the tubular rods together in longitudinally spaced relation. 95

In testimony whereof we affix our signatures. 100

BERT L. MASTERS.
JOHN SINADIN. 105

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